Isolated Frontal Sinus Surgery Pathologies

İzole Frontal Sinüs Cerrahi Patolojileri

Frontal Sinüs, Patology

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Özet

Amaç: Frontal sinüs patolojileri, diğer paranazal sinüs patolojilerine göre daha nadir görülürler. Ancak frontal sinüsün önemli anatomik yapılarla yakın komşuluğu nedeniyle iyi huylu tümörleri bile önemli semptom ve komplikasyonlara neden olabilir. Frontal sinüsde en sık görülen patolojiler mukoseller ve osteomlardır. Biz bu çalışmada frontal sinüs patolojisi nedeniyle opere etiğimiz hastaları retrospektif olarak taradık ve literatür eşliğinde değerlendirdik. Gereç ve Yöntem: Bu çalışmada Eylül 1999-Mart 2016 tarihleri arasında endoskopik sinüs cerrahisi yapılan 1143 hasta retrospektif olarak değerlendirildi. Çalışmaya frontal sinüsdeki patoloji nedeniyle opere ettiğimiz 12 frontal osteom, 44 frontal mukosel tanısı alan hastalar kabul edildi. Bulgular: 1143 hastanın sadece 56 (%4.8) sında izole frontal sinüs patolojisi mevcuttu. Bu hastaların 12si frontal osteom, 44 frontal mukosel tanısı nedeniyle opere edildi. Osteom tanısı alan 12 hasta eksternal cerrahi ile opere edildi. 2 hastada bikronal flep, 10 hastada kaşiçi insizyon kullanıldı. Mukosel tanısı alan 44 hastanın 13ü eksternal yaklaşım ile cerrahi yapıldı. Frontal sinüs ön duvar defekti olup PNSCT de frontal resesi oblitere olan 3 hastada endoskopik yaklaşım osteoplastik flep ile kombine edildi. Dura defekti fasia latadan alınan greft ile onarıldıktan sonra frontal sinüs abdomenden alınan yağ dokuyla oblitere edildi. 28 hasta endoskopik cerrahi ile tedavi edildi. Tartışma: Frontal sinüs patolojilerinde cerrahi yaklaşımlar da günümüzde hala tartışma konusudur. Endoskopik sinüs cerrahisi tanımlandığından beri diğer tüm paranazal sinüs cerrahilerinde endoskopik yaklaşım altın standart olsa da frontal sinüs cerrahisinde eksternal yaklaşımlar günümüzde hala güncelliğini korumaktadır. Genel görüş frontal sinüs ön duvarında defekt varsa, sinüs dışına özellikle orbita duvarına uzanım mevcutsa, lezyon frontal sinüs içerisinde lateral yerleşimli ise veya arkada durada defekt mevcuta eksternal cerrahinin endoskopik yaklaşıma tercih edilmesi yönündedir.

Anahtar Kelimeler

Frontal Sinüs; Cerrahi; Mukosel; Osteom

Abstract

Aim: Frontal sinus pathologies are seen less often than other paranasal sinus pathologies. However, the close proximity of the frontal sinus to important anatomic structures can cause significant symptoms and complications. The pathologies most frequently seen in the frontal sinus are mucoceles and osteoma. In this study, a retrospective scan was made of patients operated on for frontal sinus pathology and these patients were evaluated in light of the literature. Material and Method: A retrospective evaluation was made of 1143 patients who underwent endoscopic sinus surgery between September 1999 and March 2016. The patients included in the study were those operated on for a diagnosis of frontal osteoma in 12 cases and for frontal mucocele in 44 cases. Result: Of the total 1143 patients initially scanned, isolated frontal sinus pathology was determined in only 56 (4.8%). These patients underwent surgery for frontal osteoma in 12 cases and for frontal mucocele in 44 cases. In 12 patients diagnosed with osteoma, surgery was performed with the external approach. Bicoronal flap was applied in 2 patients and inside eyebrow incision in 10. Of the 44 patients diagnosed with mucocele, surgery was performed with the external approach on 13 patients. In 3 patients with frontal sinus anterior wall defect and frontal recess obliterated on PNS CT, the endoscopic approach was combined with osteoplastic flap. After repair of the dura defect with graft taken from the fascia lata, the frontal sinus ws obliterated with fat tissue taken from the abdomen. Of the 44 patients diagnosed with mucocele, surgery was performed with the endoscopic approach on 28 patients. Discussion: The surgical approaches in frontal sinus pathologies remain a matter of debate. Although endoscopic sinus surgery has been the gold standard among all paranasal surgical approaches since it was first introduced, external approaches still remain current. The general view is that if there is a defect in the frontal sinus anterior wall and there is extension outside the sinus to the orbit wall in particular, if the lesion has lateral localisation within the frontal sinus, or if there is a defect in the posterior dura, external surgery should be preferred to external surgery.

Keywords

Frontal Sinus; Surgery; Mucocele; Osteoma

DOI: 10.4328/JCAM.4809 Received: 27.09.2016 Accepted: 02.11.2016 Printed: 01.05.2017 J Clin Anal Med 2017;8(3): 235-8
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Introduction

Frontal sinus pathologies are seen less often than other paranasal sinus pathologies [1,2]. However, the close proximity of the frontal sinus to important anatomic structures can cause significant symptoms and complications. Symptoms vary according to the extent of the frontal sinus pathology [2]. If extension is seen towards the inferior of the frontal sinus, there may be ophthalmic symptoms such as propitosis and diplopia. If it is seen to extend to the posterior and enters the head, there can be intracranial pathologies such as meningitis and brain abscess. Finally, if there is exposure towards the anterior there can be cosmetic symptoms [1,3]. Sometimes the pathology in the frontal sinus may itself close the frontal ostium and only cause sinusitic symptoms [3].

The pathologies most frequently seen in the frontal sinus are mucoceles and osteoma. Regarding the paranasal sinuses, mucoceles generally involve the frontal sinus. They are a benign tumour but because of their expansive properties they can show extension to the surrounding tissue by destruction of the bone [4,5]. It is known that they can occur because of any blockage in the frontal ostium. Fu et al. [1] classified mucocele into two main groups according to the etiology. These were identified as secondary mucocele if there was an evident pathology closing the ostium (polyp, tumour, trauma, or surgical-related scar tissue) and as primary mucocele if there was no pathology other than anatomic variation closing the ostium. It has been shown that within all the paranasal sinuses, secondary mucocele are seen particularly in the frontal sinus.

As frontal osteoma are generally asymptomatic, the real incidence is unknown [6]. Of all the paranasal sinuses, the frontal sinus is most often involved. Osteoma are slow-growing benign tumours and very rarely spread to the orbit and intercranial region [7]. Generally they are symptomatic and there is no association between size and symptoms [8]. Sometimes a very small osteoma may cause widespread face and head pain. Apart from Gardner syndrome, in which multiple lesions are seen, frontal osteoma is usually seen as a single lesion [6,7]. Although trauma, inflammation, and heredity are responsible in the etiology, the subject of etiological factors remains controversial [6,7,8].

The treatment for frontal sinus pathologies is surgery [1,2,4,5,8]. However, because of the anatomic character of the frontal sinus, operations are more difficult and complicated than for other paranasal sinuses. During surgery, it should be considered that secondary frontal mucocele may develop following intervention in the frontal recess [1,2].

In this study, a retrospective scan was made of patients operated on for frontal sinus pathology and these patients were evaluated in light of the literature.

Material and Method

A retrospective evaluation was made of 1143 patients who underwent endoscopic sinus surgery between September 1999 and March 2016. The patients included in the study were those operated on for a diagnosis of frontal osteoma in 12 cases and for frontal mucocele in 44 cases. Other cases of pathologies affecting the paranasal sinuses, such as chronic sinusitis and nasal polyposis, were excluded from the study. All the patients were preoperatively evaluated with diagnostic nasal endoscopy and high-resolution paranasal sinus CT.

Surgical Approach:

Intervention to the frontal sinus was performed using an external approach, an endoscopic approach, or a combined approach. External Approach: For the external approach, a bicoronal flap or an incision within or over the eyebrows is preferred. Leaving the perichondrium intact, the flap is raised as far as the frontal sinus anterior wall inferior border. A template was created by cutting the sinus projections on the Caldwell radiograph taken of the patients. Using this template, the sinus projection of the mass over the frontal sinus periosteum was marked. By making a periosteal incision that was 1-1.5 cm greater in each direction from the marked sinus projection area, the periosteum was carefully elevated. With the aid of the marked area on the Caldwell radiograph, the frontal sinus anterior wall was opened as a cover. In cases of frontal sinus mucocele, the content of the mucocele was aspirated. The frontal sinus ostium was checked and the frontal recess was opened (Figure 1). If a dura defect was determined during the operation, the defect was closed with a graft taken from the fascia lata and to support the graft, the frontal sinus was obliterated with fat tissue taken from the abdomen. In case of frontal sinus osteoma; ıts in the broken base with the help of tour after dilution was tried to be intact.

Endoscopic Approach: A Draft 2 frontal sinusotomy was applied to all the patients. After identification of the frontal recess and ostium, the frontal ostium was widened with curettage and forceps.

Combined Approach: External surgery was combined with the endoscopic approach.

The patients were followed up postoperatively for at least 13 months – 4 years. Endoscopic examination was made for the follow-up. PNS CT was only requested for patients thought to have recurrence.

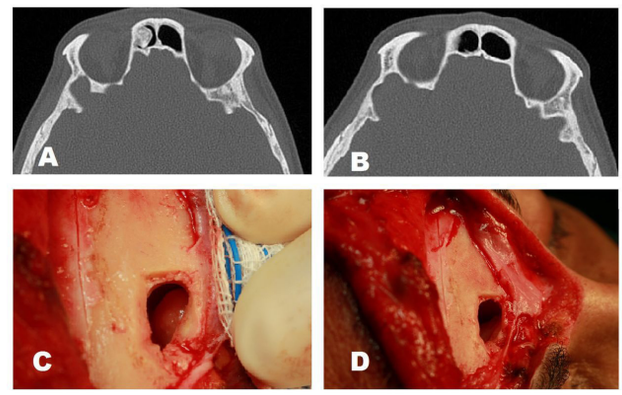

Figure 1. External approach to the frontal sinus osteoma. Preoperative paranasal sinus CT(A), Osteoma in the frontal sinus (B), Postoperative paranasal sinus CT (C), After removal of the frontal sinus osteoma (D).

Results

Of the total 1143 patients initially scanned, isolated frontal sinus pathology was determined in only 56 (4.8%). These patients underwent surgery for frontal osteoma in 12 cases and for frontal mucocele in 44 cases. Of the 44 patients with frontal mucocele, there was no organic pathology closing the frontal ostium in 37 cases and these patients were accepted as pri-

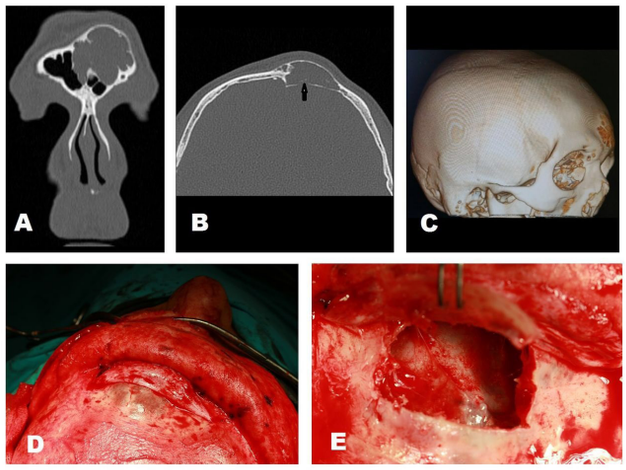

Figure 2. Frontal Mucocele. Right Frontal Sinus mucocele preoperative (coronal scan)(A), Right Frontal Sinus mucocele preoperative (axial scan). Black arrow: Frontal sinus anterior wall defect (B), Frontal sinus anterior wall defect (3D tomograpy scan) (C), External frontal sinus surgery indication of the frontal wall defect (D), After removal of the frontal sinus osteoma (E).

Figure 3. Developing secondary mucocele due to inverted papilloma obliterated by the frontal recess (star: upper orbital wall defects)

mary mucocele. In the 7 patients in the secondary mucocele group, the frontal sinus ostium was obliterated and therefore frontal mucocele developed because of inverted papilloma in 1 case, panpolyposis in 1 case, and transfer to endoscopic sinus surgery in 5 cases.

The 56 patients comprised 32 (57%) females and 24 (43%) males. All the patients presented with the complaint of headache, which was retrobulbar in 20 (36%) cases and in the frontoethmoidal region in 36 (64%). Nasal obstruction was determined in 32 (57%) patients, postnasal discharge in 23 (41%), and sensitivity with pressure on the frontal region in 10 (18%). In 12 patients diagnosed with osteoma, surgery was performed using the external approach. The form of incision was dependent on the size of the osteoma and patient preference. Bicoronal flap was applied in 2 patients and eyebrow incision in 10. Of the 44 patients diagnosed with mucocele, surgery was performed using the external approach in 13 patients, of whom 7 had a defect in the frontal sinus anterior wall, 4 had intracranial extension, and in 3, the mucocele had a lateral localisation in the frontal sinus. In 3 patients showing frontal sinus anterior wall defect and frontal recess obliterated on PNS CT, the endoscopic approach was combined with osteoplastic flap. After repair of the dura defect with graft taken from the fascia lata, the frontal sinus was obliterated with fat tissue taken from the abdomen. Of the 44 patients diagnosed with mucocele, surgery was performed using the endoscopic approach on 28 patients [Table 1].

Table 1. Frontal rate of surgical pathology

	External Approach	Endoscopy	Combine Approach	Total
Frontal Mucocele	12	-	-	12
Frontal Osteoma	13 (29 %)	28 (64 %)	3 (7 %)	44

All the patients were followed up with endoscopic examinations for 9 months – 4 years. No recurrence was determined in any patient who underwent surgery because of frontal osteoma. Of the 44 patients diagnosed with frontal mucocele, recurrence developed in 1 patient in the 41st month postoperatively. On the preoperative PNS CT taken of this patient, there was panpolyposis together with a lateral frontal mucocele exposing the orbit superior wall. The patient was operated on with the endoscopic approach combined with osteoplastic flap. In the postoperative 41st month, recurrence was determined of both the panpolyposis and the frontal sinus mucocele in the orbit superior wall. The patient was again operated on with a combined approach and in the postoperative 12th month no recurrence was determined.

Discussion

Frontal sinüs surgery is still a matter of debate, with respect both to examination and surgical methods [3,4,9]. As neither the frontal sinus nor the frontal ostium are opened in anterior rhinoscopy or diagnostic nasal endoscopy, it is not possible to evaluate the frontal recess. Paranasal sinus tomography is of critical importance in the diagnosis of frontal sinus pathologies [2,4,7,9]. However, surgical experience is needed to know when and for which disease it should be requested. Sometimes, just as frontal pathology may be revealed to be underlying an atypical headache, no frontal sinus pathology is found in a patient with headache and frontal region sensitivity.

The surgical approaches in frontal sinus pathologies remain a matter of debate [2-5, 7-9]. Although endoscopic sinus surgery has been the gold standard among all paranasal surgical approaches since it was first introduced, external approaches still remain current [4,5,9]. The general view is that if there is a defect in the frontal sinus anterior wall and there is extension outside the sinus to the orbit wall in particular, if the lesion has lateral localisation within the frontal sinus, or if there is a defect in the posterior dura, external surgery should be preferred to endoscopic surgery [1,2,4,5]. This is because dura defects and defects in the orbit roof or in the frontal sinus anterior wall can be repaired in the same session and a better visualisation angle can be obtained with an external approach to laterally located tumours [2,4,9].

In addition, during specification of the osteoma base in frontal osteoma surgery, an external approach is preferred by surgeons

over an endoscopic approach because a better visualisation angle is provided. However, there is no definitive criterion as to when an endoscopic approach or external surgery should be applied. An endoscopic approach is less invasive than an external approach and provides better mucociliary clearance, so is therefore more often preferred in frontal mucocele surgery. In an extensive meta-analysis study by Courson et al. [5] no statistically significant difference was found between endoscopic and external approaches with respect to either recurrence or complications. Har-El et al. [10] applied endoscopic-wide marsupialisation in 66 cases of frontal mucocele and no recurrence was determined in any patient. In 1 patient with a defect in the frontal sinus anterior wall, marsupialisation was applied only to the mucocele mucosa. In the 6th month postoperatively the defect was seen to have spontaneously closed.

In our clinic, an external approach was preferred in patients with frontal osteoma because it provides a better visualisation angle. In cases of frontal mucocele, the decision regarding the type of surgery was made according to the condition of the frontal recess. In patients with a defect in the dura or frontal sinus anterior wall, the external approach was used. However, if there was an appearance of obliterated frontal recess on the paranasal sinus tomography, a combined approach was applied by endoscopically widening the frontal recess.

Competing interests

The authors declare that they have no competing interests.

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How to cite this article:
Gür ÖE, Sonbay Yılmaz ND, Ensari N. Isolated Frontal Sinus Surgery Pathologies. J Clin Anal Med 2017;8(3): 235-8.